DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 8772-3, Poinsett Hutterian Brethren, Inc.

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8772-3, Poinsett Hutterian Brethren, Inc., c/o Levi Tschetter, 46527 189th Street, Estelline SD 57234.

The Chief Engineer is recommending APPROVAL of Application No. 8772-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The well approved under Water Permit No. 8772-3 is located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals shall be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

2. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund

Eric Gronlund, Chief Engineer
August 15, 2023

Report to the Chief Engineer

On Water Permit Application No. 8772-3

Poinsett Hutterian Brethren Inc.

August 16th, 2023

Water Permit Application No. 8772-3 proposes to authorize 1.78 cubic feet per second (cfs) from one well completed into the Big Sioux: Brookings aquifer (85 feet deep) located in the NW ¼ SE ¼ Section 27 for irrigation of 136 acres located in the SW ¼ Section 26; all in T114N-R51W. Water Right No. 5328-3 also authorizes irrigation of the same area (127.5 acres, SW ¼ Section 26) and NE ¼ Section 27 from two existing wells completed into the Big Sioux: Brookings aquifer located in the NE ¼ Section 27; all in T114N-R51W. Water Right No. 5627A-3 authorized irrigation of the NW ¼ Section 26 from one of the wells authorized by No. 5328-3. If approved, Water Permit Application 8772-3 will allow operation of both center pivots in the W ½ Section 26-T114N-R51W at the same time and add 8.5 acres to the total number of permitted acres. The site of interest is located in Hamlin County approximately 6 miles north of Estelline, SD.

AQUIFER: Big Sioux: Brookings (BS:B)

HYDROGEOLOGY:

The Brookings management unit of the Big Sioux aquifer is a Quaternary-aged glacial outwash that consists of medium to very coarse sand and very fine to medium gravel (Kume, 1985; Hamilton, 1989). The depth of the top of the Big Sioux: Brookings aquifer ranges from the land surface in the Big Sioux River floodplain to 212 feet below land surface (Hamilton, 1989). In Brookings, Deuel, Hamlin, Kingsbury, Moody, and Codington Counties, the Big Sioux: Brookings aquifer is estimated to underly approximately 323,000 acres and contain approximately 1,453,000 acre-feet of recoverable water in storage, as shown in Figure 1 (Hedges et al, 1982 and Stonesifer, 2013). The direction of groundwater movement in the Big Sioux: Brookings aquifer is in a southern direction and towards the Big Sioux River (Hamilton, 1989). The aquifer is unconfined near the Big Sioux River and along major tributary valleys, but elsewhere the aquifer may be confined by overlying till or clay lenses (Hamilton, 1989).

A water well completion report was not submitted with Water Permit Application No. 8772-3; so, a nearby water well completion report will be used instead (Water Rights, 2023d). The water well was completed on October 8, 2013 (Water Rights, 2023d). The water well completion report indicates the well is completed into the Big Sioux: Brookings aquifer with the top of aquifer bearing material (coarse gravel) at 33 feet below the ground surface, a static water level of 26.1 feet below the ground surface, and a total aquifer saturation of 17 feet at the time of well completion (Water Rights, 2023d). Several other nearby water well completion reports for the Big Sioux: Brookings aquifer show the aquifer to be confined near the location of the diversion point (SDGS, 2023; Water Rights, 2023b and 2023d). Considering all the nearby water well completion reports indicating confined conditions, the aquifer at the diversion point for this application is likely to be locally confined.

South Dakota Codified Law (SDCL) 46-2A-9

Pursuant to SDCL 46-2A-9, "A permit to appropriate water may be issued only if there is a reasonable probability that unappropriated water is available for the applicant's proposed use, the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, the proposed use is a beneficial use, and the permit is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by SDCL 46-2-9 and 46-2-11." This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic uses and water rights within the Big Sioux: Brookings aquifer.

WATER AVAILABILITY:

Water Permit Application No. 8772-3 proposes to appropriate water from the Big Sioux: Brookings aquifer. The probability of unappropriated water being available from the aquifer can be evaluated by considering SDCL 46-6-3.1, which requires "No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source. An application may be approved, however, for withdrawals of groundwater from any groundwater formation older than or stratigraphically lower than the greenhorn formation in excess of the average estimated annual recharge for use by water distribution systems." The Big Sioux: Brookings aquifer is not older than or stratigraphically lower than the Greenhorn Formation, and the applicant's proposed use is not for use in a water distribution system as defined by SDCL 46-1-6(17). Therefore, the average annual recharge and average annual withdrawal rates to and from the Big Sioux: Brookings aquifer must be considered.

HYDROLOGIC BUDGET:

Recharge

Recharge to the Big Sioux: Brookings aquifer is received primarily through infiltration of precipitation and seepage through till, lake deposits, and underlying aquifers (Hamilton, 1989). Using observation well analysis, Hedges et al (1985) estimated a recharge rate of 4.0 inches per year for the Big Sioux: Brookings aquifer. The Big Sioux: Brookings aquifer has an estimated areal extent of approximately 323,000 acres (Stonesifer, 2013). Therefore, the average annual recharge rate for the Big Sioux: Brookings aquifer (based on Hedges et al, 1985; Stonesifer, 2013) is approximately 107,667 acre-feet/year.

Discharge

Discharge from the Big Sioux: Brookings aquifer primarily occurs through well withdrawals, seepage to surface water features, and evapotranspiration in areas where the aquifer is at or near land surface (Hamilton, 1989). Currently, there are 262 water rights/permits authorized to appropriate water from the Big Sioux: Brookings aquifer (Water Rights, 2023c). There are two other pending applications (Application Nos. 8753-3 and 8758-3) for the Big Sioux: Brookings aquifer with a priority date senior to this application. There are 11 future use permits reserving

6,041 acre-feet/year of water from the Big Sioux: Brookings aquifer, shown on Table 1 (Water Rights, 2023c).

Table 1. Future Use Permit reserved water for the Big Sioux: Brookings aquifer (Water Rights, 2023c)

Future Uses Permit Holder	Permit Nos.	Amount of Reserved Water (acre-feet)
Joint Well Fields Inc.	3982-3, 3982A-3, 3982B-3, 6988-3	2,375
City of Lake Norden	4055-3, 6261-3	0
City of Castlewood	558A-3	123
City of Volga	5875-3, 6259-3	1,143
Sioux Rural Water System	5094-3, 7853-3	2,400
	TOTAL:	6,041

Table 2 summarizes the 48 non-irrigation water rights/permits authorized to appropriate water from the Big Sioux: Brookings aquifer with the estimated annual use for each water right/permit as determined by their limiting diversion rate or annual volume. The amount of water that can be withdrawn was estimated by assuming the non-irrigation water rights/permits limited by an annual volume will withdraw their entire appropriated volume every year. It is estimated that non-irrigation water rights/permits limited only by a diversion rate will pump at their maximum permitted diversion rate for 60 percent of the time. The 60 percent estimation was established by Water Rights Staff to be a reasonable and safe estimate of average annual withdrawals by non-irrigation appropriations. Historically, the 60 percent estimate has been accepted by the Water Management Board. It should be noted that some of the water permits/rights listed on Table 2 are connected to rural water systems and use rural water rather than their local wells; so, they will not contribute to the annual withdrawal rate. This includes water rights for the Town of Hayti which purchases all their water from the Sioux Rural Water System and the City of Clear Lake which purchases all their water from the Brookings-Deuel Rural Water System (Drinking Water, 2023). Overall, the annual withdrawal rate for the Big Sioux: Brookings aquifer non-irrigation water rights/permits is approximately 15,247 acre-feet/year (Table 2) (Water Rights, 2023c).

Table 2. Estimated annual use for non-irrigation water rights/permits authorized to divert water from the Big Sioux: Brookings aquifer (Water Rights, 2023c)

Permit No.	Name	Status	Uses	Authorized Diversion Rate (cfs)	Authorized Annual Volume (acre-feet)	Estimate Use (acre-feet/year)
2111-3	GOPHER SIGN CO	LC	COM	0.040	N/A	17.38
5675-3	LAKE POINSETT ESTATES	LC	COM	0.090	N/A	39.10
6019-3	DAKOTA WHOLESALE BAIT INC	LC	COM, DOM	0.355	N/A	154.21
6329-3	OSWALD	LC	COM	1.280	N/A	556.03
6745-3	HANSEN	LC	COM	0.110	N/A	47.78
6785-3	DRUMGOON DAIRY LP	LC	COM, LCO	0.200	N/A	86.88
6786-3	NYSTROM	LC	COM, LCO	0.170	N/A	73.85
7277-3	OLD TREE FARMS	LC	COM, LCO	0.100	N/A	43.44

Permit No.	Name	Status	Uses	Authorized Diversion Rate (cfs)	Authorized Annual Volume (acre-feet)	Estimate Use (acre-feet/year)
7854-3	ULVESTAD	PE	COM, LCO	0.890	N/A	386.62
7259-3	OLD APOSTOLIC LUTHERAN CHURCH	LC	GEO	1.000	120.00	120.00
5129-3	TECHNICAL ORDNANCE INC	LC	IND	0.100	N/A	43.44
6146-3	SD SOYBEAN PROCESSORS	LC	IND	0.144	N/A	62.55
1317-3	ESTELLINE	LC	MUN	1.100	N/A	477.84
1759-3	VOLGA	LC	MUN	1.650	N/A	716.76
3117-3*	HAYTI	LC	MUN	0.330	N/A	0.00
4950-3	BRUCE	LC	MUN	0.270	N/A	117.29
5071-3*	CLEAR LAKE	LC	MUN	0.450	N/A	0.00
5167-3	VOLGA	LC	MUN	0.450	N/A	195.48
534A-3*	CLEAR LAKE	LC	MUN	1.100	N/A	0.00
557-3	LAKE NORDEN	LC	MUN	3.000	N/A	1303.20
558B-3	CASTLEWOOD	LC	MUN	0.560	N/A	243.26
558D-3	CASTLEWOOD	LC	MUN	0.330	N/A	143.35
5645-3	ESTELLINE	LC	MUN	0.660	N/A	286.70
617-3*	HAYTI	LC	MUN	0.660	N/A	0.00
5815-3	LAKE NORDEN	LC	MUN	0.560	139.00	139.00
5941-3	VOLGA	LC	MUN	0.890	644.00	644.00
6417-3	LAKE NORDEN	LC	MUN	1.450	630.00	630.00
6542-3	LAKE NORDEN	LC	MUN	0.600	262.00	262.00
8640-3	VOLGA	PE	MUN	1.110	645.00	645.00
2033-3	SIOUX RURAL WATER SYSTEM	LC	RWS	0.750	N/A	325.80
4830-3	BROOKINGS-DEUEL RWS	LC	RWS	2.000	N/A	868.80
5079-3	BROOKINGS-DEUEL-KINGBROOK	LC	RWS	2.900	N/A	1259.76
5098-3	SIOUX RURAL WATER SYSTEM	LC	RWS	2.000	N/A	868.80
5434-3	BROOKINGS-DEUEL-KINGBROOK	LC	RWS	1.000	434.00	434.00
5602-3	BROOKINGS-DEUEL-KINGBROOK	LC	RWS	1.000	434.00	434.00
5960-3	SIOUX RURAL WATER SYSTEM	PE	RWS	1.330	600.00	600.00
6002-3	BROOKINGS-DEUEL-KINGBROOK	LC	RWS	1.000	362.00	362.00
2245B-3	BROOKINGS-DEUEL RWS	LC	RWS	1.930	270.00	270.00
6718-3	BROOKINGS-DEUEL-KINGBROOK	LC	RWS	1.000	300.00	300.00
7381-3	BROOKINGS-DEUEL RWS	PE	RWS	0.000	N/A	0.00
7852-3	SIOUX RURAL WATER SYSTEM INC	PE	RWS	1.330	600.00	600.00
8185-3	JOINT WELL FIELD INC.	PE	RWS	0.000	603.00	603.00
7852A-3	SIOUX RURAL WATER SYSTEM	PE	RWS	0.000	N/A	0.00
6988A-3	JOINT WELL FIELD INC	PE	RWS	0.000	N/A	0.00
8371-3	JOINT WELL FIELD INC	PE	RWS	0.000	434.00	434.00
8732-3	SIOUX RURAL WATER SYSTEM	PE	RWS	0.000	N/A	0.00
1956-3	MEYER	LC	SHD	1.000	N/A	434.40
1956-3A	HAMILTON	LC	SHD	0.040	N/A	17.38
LC Licensed Water Right, PE Water Permit, COM Commercial, DOM Domestic, LCO Livestock Confinement Operation, GEO Geothermal, IND Industrial, MUN Municipal, RWS Rural Water System, SHD Suburban Housing Development, *These Water Rights get their water from a separate system rather than local wells.					**TOTAL:**	15,247

Currently, there are 214 irrigation water rights/permits appropriating water from the Big Sioux: Brookings aquifer (Water Rights, 2023c). Irrigation water rights/permits have been typically required to report their annual usage by submitting an irrigation questionnaire since 1979. The average annual withdrawal rate for the Big Sioux: Brookings aquifer irrigation water rights/permits that have reported over the period of record (1979 to 2021) is approximately 8,943 acre-feet per year (Table 3) (Water Rights, 2023a). To reflect the current development of irrigation water rights/permits more accurately, the average annual withdrawal rate for irrigation appropriations from 2012 to 2021 is approximately 10,951 acre-feet per year (Table 3) (Water Rights, 2023a).

There are seven irrigation water permits approved in 2022-2023, that are not accounted for in Table 3, Water Permit Nos. 8601-3, 8602-3, 8638-3, 8645-3, 8669-3, 8712-3, and 8738-3 (Water Right, 2023c). There are also three pending irrigation applications Nos. 8753-3, 8758-3, and this application (Water Right, 2023c). Water Permit Nos. 8601-3, 8602-3, 8638-3, 8645-3, 8669-3, 8712-3, and 8738-3 combined are authorized to irrigate approximately 634 acres (Water Rights, 2023c). Generally, irrigators in eastern South Dakota apply less than one foot of water per acre per year. However, one foot of water per acre per year application rate will be used to somewhat overestimate the annual withdrawal rate for these irrigation water rights/permits. Therefore, the estimated average annual withdrawal rate for Water Permit Nos. 8601-3, 8602-3, 8638-3, 8645-3, 8669-3, 8712-3, and 8738-3 is estimated at approximately 634 acre-feet per year. Additionally, this application and other pending applications (Nos. 8753-3 and 8758-3) propose to use approximately 276 acre-feet per year. Collectively, the average annual withdrawal rate for the irrigation appropriations from 2012 to 2021 (10,951 acre-feet/year), plus the estimated average annual withdrawal rate for the irrigation water permits approved in 2022-2023 and pending applications (910 acre-feet/year), is approximately 11,861 acre-feet per year.

Table 3. Reported historic irrigation use from the Big Sioux: Brookings aquifer (Water Rights, 2023a)

Year	No. of Permits Reporting	Reported Pumpage (acre-feet)
1979	184	6,144
1980	187	9,837
1981	198	9,040
1982	155	4,558
1983	161	8,227
1984	188	8,177
1985	181	4,951
1986	179	2,855
1987	171	10,015
1988	167	18,521
1989	166	13,931
1990	175	5,863
1991	165	7,772
1992	162	2,332
1993	162	1,043
1994	160	2,855
1995	161	3,862
1996	154	7,221
1997	153	5,650
1998	157	8,110
1999	155	7,841
2000	153	8,934
2001	149	8,385
2002	149	12,411
2003	149	11,380
2004	156	11,810
2005	159	11,513
2006	161	14,325
2007	164	12,730
2008	166	12,506
2009	174	9,173
2010	172	2,713
2011	174	8,528
2012	177	19,483
2013	198	15,432
2014	212	9,948
2015	209	8,796
2016	210	10,267
2017	209	9,572
2018	211	7,953
2019	211	106
2020	209	10,001
2021	205	17,955
Max	**212**	**19,483**
Min	**149**	**106**
Avg (1982-2021)	**174**	**8,943**
Avg (2012-2021)	**205**	**10,951**

There are domestic wells completed into the Big Sioux: Brookings aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2023d). Due to their relatively low diversion rates, withdrawals from domestic wells are not considered to be a significant portion of the hydrologic budget. Additionally, with the development of rural water systems in areas where the Big Sioux: Brookings aquifer is the uppermost aquifer available; it is likely some domestic users may have transitioned to rural water. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Big Sioux: Brookings aquifer.

Hydrologic Budget Summary

The average annual recharge rate to the Big Sioux: Brookings aquifer is estimated to be about 107,667acre-feet/year (Stonesifer, 2013). The average withdrawal rate from the Big Sioux: Brookings aquifer totals to approximately 33,149 acre-feet/year; (future use: 6,041 acre-feet/year; non-irrigation: 15,247 acre-feet/year; and irrigation (avg 2012 to 2021 plus the water rights/permits approved between 2021 and 2022) and pending applications: 11,861 acre-feet/year). Based on the hydrologic budget, there is a reasonable probability unappropriated water is available from the Big Sioux: Brookings aquifer for the proposed appropriation.

OBSERVATION WELL DATA:

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon the record of observation well measurements in addition to other data to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated average annual recharge of the aquifer.

The DANR-Water Rights Program monitors 77 observation wells completed into the Big Sioux: Brookings aquifer. The observation wells completed into the aquifer are shown on Figure 1 (Water Rights, 2023b). These observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The three closest observation wells to the existing diversion point are HN-77F (approximately 0.5 miles southwest), HN-83A (approximately 2.6 miles southeast), and HN-57B (approximately 3.4 miles southwest) (Water Rights, 2023b). The hydrographs for these observation wells are displayed in Figures 2 to 4 respectively (Water Rights, 2023b). The data points utilized to construct the hydrographs are measurements of the static water level in the observation wells from the top of the well casing. The majority of observation wells in the Big Sioux: Brookings aquifer have a stable water level, with several observation wells that are under the influence of heavy pumping showing a history of slightly declining water levels that eventually stabilize. The data shown on Figures 2 to 4 share a similar trend with most of the observation wells in the Big Sioux: Brookings aquifer.

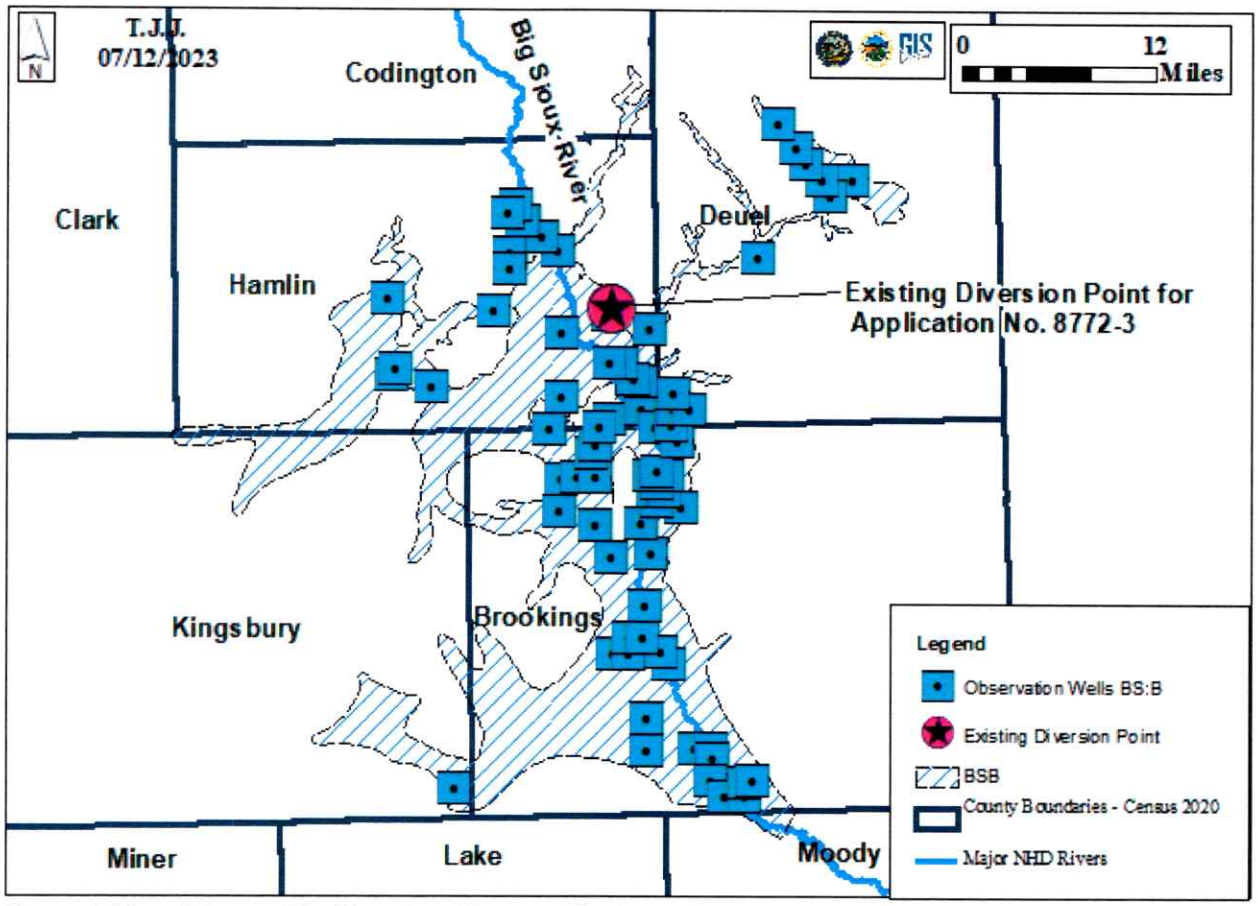

Figure 1. Map of the area Big Sioux: Brookings aquifer observation wells (Water Rights, 2023b and 2023c), and the location of diversion point for Water Permit Application No. 8772-3.

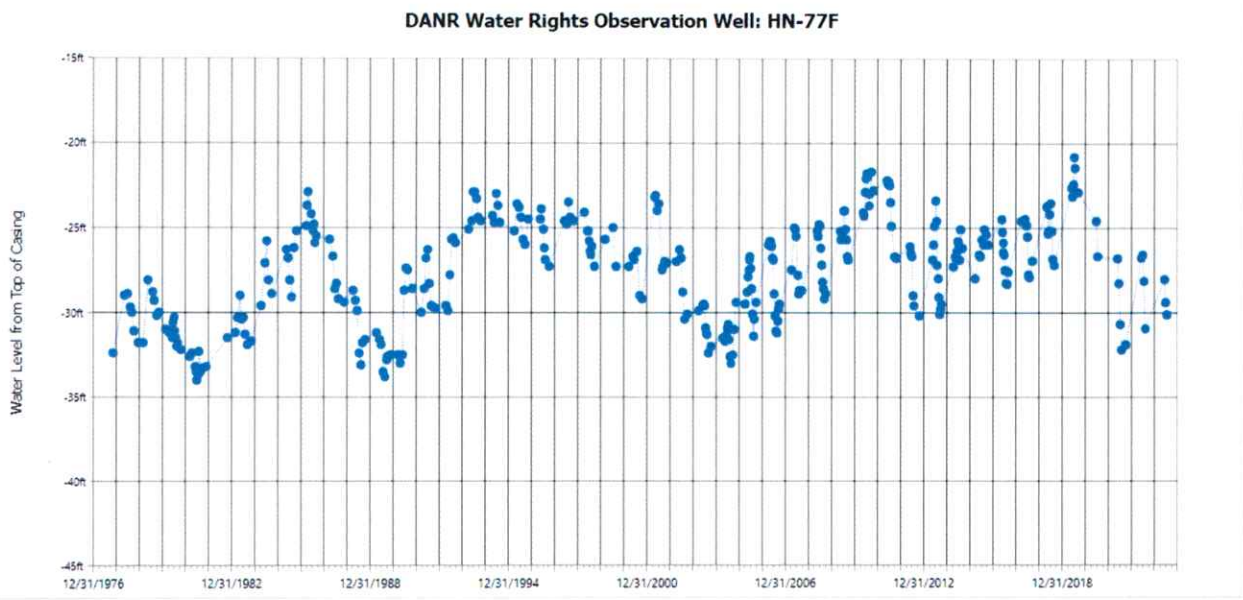

Figure 2. Hydrograph for observation well HN-77F (Water Rights, 2023b)

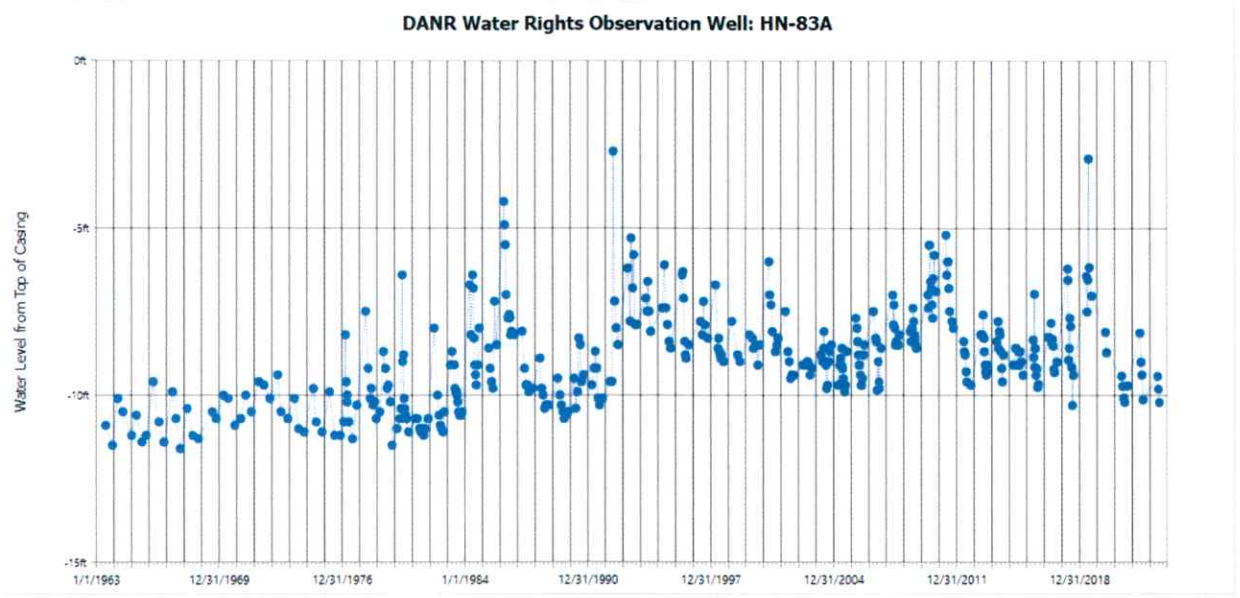

Figure 3. Hydrograph for observation well HN-83A (Water Rights, 2023b)

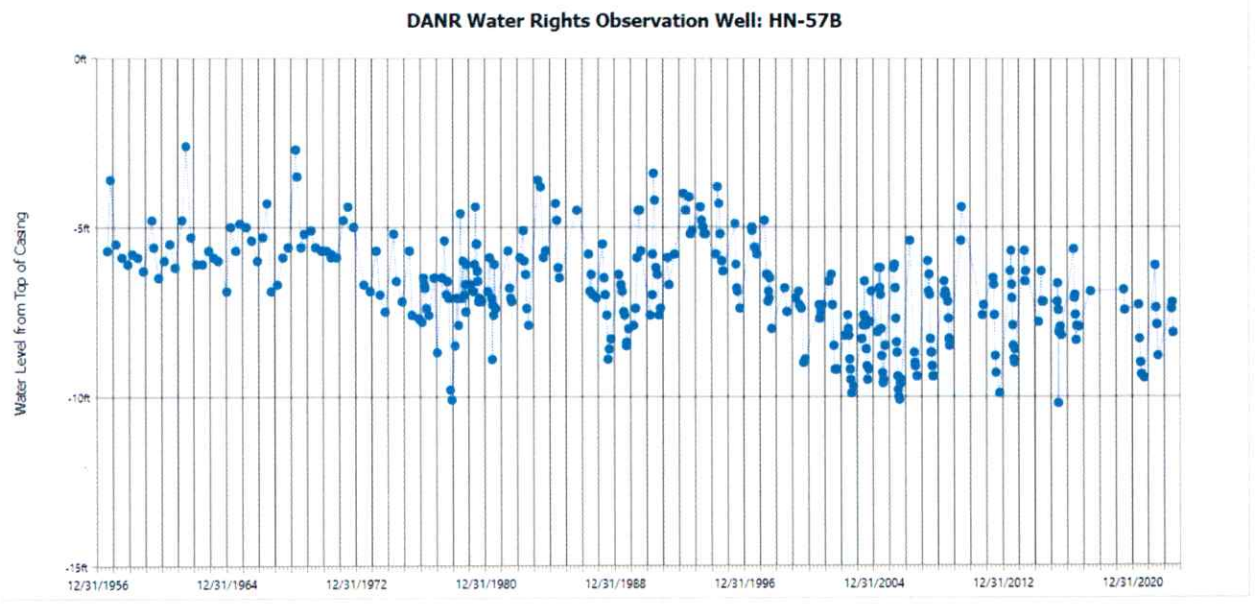

Figure 4. Hydrograph for observation well HN-57B (Water Rights, 2023b)

The hydrographs, Figures 2 and 3, for the observation wells display generally stable water levels which is representative of a majority of other observation wells in the Big Sioux: Brookings aquifer. However, observation well HN-57B seems to have some issues with its construction causing possibly affecting water level measurements (Drennon, 2023). The hydrograph for HN-57B, Figure 4, shouldn't be considered directly representative of the Big Sioux: Brookings aquifer. The hydrographs for the Big Sioux: Brookings aquifer indicate that the aquifer responds well to climatic conditions because water levels are rising during wetter periods (early spring snowmelt and precipitation) and declining to a stable water level during drier periods. Additionally, the water levels in the observation wells display that the amount of recharge to and natural discharge from the aquifer greatly exceeds pumping with the aquifer returning to pre-

pumping conditions between irrigation seasons. Aquifer recovery indicates that climatic conditions and therefore, the effects of recharge to and natural discharges from the aquifer govern the long-term fluctuations of waters levels in the aquifer rather than the impacts of pumping from the Big Sioux: Brookings aquifer. By recognizing that both recharge to and natural discharge from an aquifer can be captured for pumping, the observation well hydrographs demonstrate unappropriated water is available for the proposed appropriation.

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

Water rights/permits in the general vicinity of the existing well site for this application are shown in Figure 5 and summarized in Table 4 (Water Rights, 2023c). The closest water right/permit (not held by the applicant) to the diversion point is Water Right No. 7896-3 which is held by Fugere Farm. The diversion point for Water Right No. 7896-3 is located approximately 0.1 miles southwest of the diversion point for this application (Water Rights, 2023c). It should be noted that Water Permit No. 8645-3 is held by Poinsett Hutterian Brethren Inc., same applicant as this application, and is located in the same location as the diversion point for this application (Water Rights, 2023c). There are domestic wells on file with the DANR-Water Rights Program that are completed into the Big Sioux: Brookings aquifer, with the closest domestic well on file (not held by the applicant) approximately 0.2 miles west of the diversion point based on the well completion report submitted by the driller (Water Rights, 2023d). The location of the domestic wells is based on the information provided by the well driller on the submitted well completion report. There could potentially be other domestic wells completed into the Big Sioux: Brookings aquifer near the diversion point that are not on file with the DANR-Water Rights Program.

Table 4. List of water rights/permits within 1 mile of the diversion point shown in Figure 5.

Permit	Name/Business	Priority	Status	Use Type	CFS	Acres
2841-3	Wayne Janssen	06/29/1976	License	Irrigation	1.78	124
3563-3	Donald Linneman	01/13/1977	License	Irrigation	2.0	238
4130-3	Laverne Mennega	06/27/1977	License	Irrigation	1.88	132
4994-3	Douglas Linneman	01/16/1984	License	Irrigation	1.66	132
5328-3	Poinsett Hutterian Brethren	04/10/1989	License	Irrigation	2.22	257.5
5402-3	Poinsett Hutterian Brethren	01/22/1990	License	Irrigation	1.77	132
5627A-3	Poinsett Hutterian Brethren	06/17/1997	License	Irrigation	1.78	136
6421-3	Keith Ebbers	05/29/2003	License	Irrigation	1.11	125
6797-3	Poinsett Hutterian Brethren	01/31/2007	License	Irrigation	1.67	136
7434-3	Poinsett Hutterian Brethren	09/14/2012	License	Irrigation	3.34	520
7896-3	Fugere Farm	09/09/2013	License	Irrigation	1.78	136
8225-3	Ralland Jassen	05/12/2016	License	Irrigation	0.11	127
8645-3	Poinsett Hutterian Brethren	07/25/2022	Permit	Irrigation	1.78	136

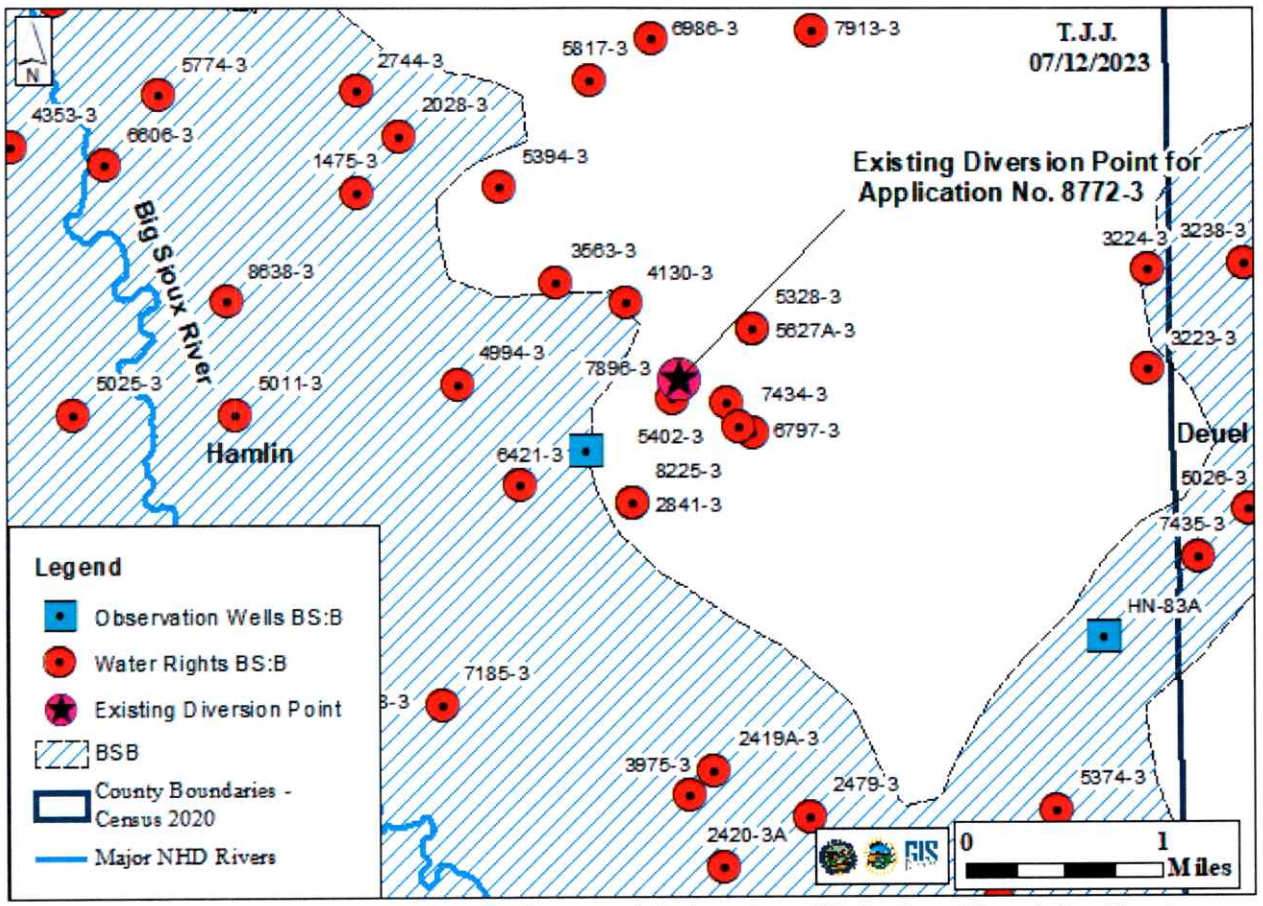

Figure 5. Map of the Big Sioux: Brookings aquifer water rights/permits within 4 miles of the existing diversion point (Water Rights, 2023b and 2023c), and the location of diversion point for Water Permit Application No. 8772-3.

The Big Sioux: Brookings aquifer is primarily under unconfined conditions. However, the aquifer is locally under confined conditions by a clay layer. In a confined aquifer, drawdown from a pumping well can extend some distance from the well. The Water Management Board recognizes that putting water to beneficial use requires a certain amount of drawdown to occur. The Board has developed rules to allow water to be placed to maximum beneficial use without the necessity of maintaining artesian head pressure for domestic use. The Water Management Board defined an "adversely impacted domestic well" in ARSD 74:02:04:20(7) as:

"A well in which the pump intake was set at least 20 feet below the top of the aquifer at the time of construction or, if the aquifer is less than 20 feet thick, is as near to the bottom of the aquifer as is practical and the water level of the aquifer has declined to a level that the pump will no longer deliver sufficient water for the well owner's needs."

The Water Management Board considered the delivery of water by artesian head pressure versus maximum beneficial use during the issuance of Water Right No. 2313-2 for Coca-Cola Bottling Company of the Black Hills. The Board adopted the Findings of Facts and Conclusions of Law that noted the reservation of artesian head pressure for delivery of water would be inconsistent with SDCL 46-1-4 which states, "general welfare requires that the water resources of the state be

put to beneficial use to the fullest extent of which they are capable..." (Water Rights, 1995). Furthermore, the Water Management Board found if increased cost or decreased production as a result of impacts on artesian head pressure by legitimate users is to be considered as an unlawful impairment, it would also conflict with SDCL 46-1-4 (Water Rights, 1995). With that in mind, some existing well owners may need to install or lower pumps depending on the specific characteristics of the Big Sioux: Brookings aquifer at their location. In Hamlin and Deuel Counties, the Big Sioux aquifer has an average saturated aquifer thickness of approximately 30 feet (Kume, 1985). Drawdown is likely to occur in the Big Sioux: Brookings aquifer. However, precise drawdown in the aquifer cannot be known without an aquifer performance test. While the best information available indicates that there is a reasonable probability average annual recharge exceeds average annual withdrawals in the aquifer, conditions can occur where withdrawals in the aquifer exceed recharge for a period of time. Situations may occur where pumping from a thicker part of an unconfined aquifer could cause drawdown impacting adequate wells in a thinner part of the aquifer. Under such conditions an unlawful impairment of senior water rights/permits or adequate domestic wells may occur. Therefore, the applicant should control their withdrawals so that nearby adequate domestic wells and senior water rights/permits are able to access needed water. When considering the statutes (SDCL 46-1-4 and 46-6-6.1), rules (ARSD 74:02:04:20 (6) and (7)), the saturated aquifer thickness near the diversion point, the lack of well interference complaints for adequate wells completed into the Big Sioux: Brookings aquifer in Hamlin County (Water Rights, 2023e), any drawdown created from the diversion is not expected to cause an unlawful impairment on existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed appropriation will not impose unlawful impairments on existing users with adequate wells.

CONCLUSIONS:

1. Water Permit Application No. 8772-3 proposes to authorize 1.78 cubic feet per second (cfs) from one well completed into the Big Sioux: Brookings aquifer (85 feet deep) located in the NW ¼ SE ¼ Section 27 for irrigation of 136 acres located in the SW ¼ Section 26; all in T114N-R51W. The site of interest is located in Hamlin County approximately 6 miles north of Estelline, SD.

2. Water Right No. 5328-3 also authorizes irrigation of 127.5 acres, located in SW ¼ Section 26 and NE ¼ section 27 from two existing wells located in the NE ¼ Section 27; all in T114N-R51W. Water Right No. 5627A-3 authorized irrigation of the NW ¼ Section 26 from one of the wells authorized by No. 5328-3. If approved, Water Permit Application 8772-3 will allow operation of both center pivots in the W ½ Section 26-T114N-R51W at the same time and add 8.5 acres to the number of permitted acres.

3. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the Big Sioux: Brookings aquifer to supply the proposed appropriation.

4. There is a reasonable probability that the diversion by Water Permit Application No. 8772-3 will not unlawfully impair adequate wells for existing water rights/permits and domestic uses.

Reviewed by:

Tyler Jensen
Natural Resources Engineer I
SD DANR - Water Rights Program

Adam Mathiowetz, PE
Natural Resources Engineer IV
SD DANR -Water Rights Program

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